

ROBBER FLY AND JAPANESE BEETLE.

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The first Japanese beetle (*Popillia japonica* Newm.) in Connecticut was found at Stamford in 1926. Due to the extensive buffer areas of woods and brushland lying between the Sound and the grounds of the Bartlett Tree Research Laboratories eight miles north, it took ten years for the beetle to reach the latter point.

The Japanese beetle was first found on the Bartlett grounds in 1936 and it seems probable that the invasion route was along the newly opened Merritt Parkway from the southwest rather than from the infestation in the city of Stamford. Japanese beetle traps were immediately placed in operation on the laboratory grounds with the following numbers of beetles trapped annually: 1936, 34 *Popillia japonica*; 1937, approximately 300 *P. japonica*; 1938, approximately 30,000 *P. japonica*; 1939, trapping discontinued as it was evident that trapping failed to exert any appreciable degree of control. The traps were simply attracting flying beetles to the area and increasing the infestation because of the great number of egg-laying females escaping capture.

The beetle population increased in a rapidly rising crescendo until 1943, the peak year. In 1944, due to a variety of causes (chief among them, the unprecedented drought) the beetle population showed a marked decline, falling back to the approximate level of 1940.

The heavy concentration of Japanese beetles in this area was turned to good advantage. Their numbers made extensive spray tests possible which resulted in the discovery of new and better insecticides. To maintain a beetle population suitable for these spray tests, no grub-proofing with arsenate of lead—which is the only control measure resulting in a wholesale kill of this pest—was practiced, although on June 3, 1941, a small portion of the lawn was treated with milky-disease as an experiment.

Large numbers of the beetle grubs in the lawns had, however, been dug out and eaten by birds, principally starlings and crows, while an even greater number were accounted for by skunks.

The adult beetles enjoyed an immunity not accorded the grubs by birds and mammals, the only bird noted killing the adult beetles being the crow.

A very interesting insect enemy of the adult beetle, however, appeared in the form of a large Robber Fly—one of the bumble-bee mimics, *Bombomima grossa* Fabr., our largest New England Asilid.

This fly was first observed feeding on the Japanese beetle on July 31, 1940, and the following records were obtained of subsequent captures. Inasmuch as female Asilids are likely to be more predacious than the males, the sex of the fly captor was recorded. However, more males than females were taken feeding on the Japanese beetle.

1. Sex of fly, male. Stamford, Conn. July 31, 1940.
2. Sex of fly, male. Stamford, Conn. August 5, 1940.
3. Sex of fly, undet. Stamford, Conn. August 21, 1940.
4. Sex of fly, undet. Stamford, Conn. August 21, 1940.
5. Sex of fly, male. Stamford, Conn. July 13, 1941.
6. Sex of fly, male. Stamford, Conn. July 23, 1941.
7. Sex of fly, female. Weston, Conn. July 26, 1941.
8. Sex of fly, male. Weston, Conn. July 27, 1941.
9. Sex of fly, female. Stamford, Conn. August 2, 1942.

It might be of interest to record other prey data of this bumblebee-like Robber Fly, which I have collected over a period of years. These are as follows:

COLEOPTERA: The beetle, *Anomala lucicola* Fabr. Sex of fly, female. Astoria, Long Island, N. Y., July 3, 1927 (S. W. B.). The carrion beetle, *Silpha americana* L. Sex of fly, female. Poundridge, N. Y., July 25, 1936 (S. W. B.). The Cetoniid beetle, *Euphoria fulgida* Fabr. Sex of fly, male. Weston, Conn., July 6, 1941. The Carrion beetle, *Silpha americana* L. Sex of fly, female. Milton, Mass., August 14, 1922 (G. W. Barber). The Carrion beetle, *Silpha americana* L. Sex of fly, female. Sturbridge, Mass., July 17, 1911 (S. W. B.). The rove beetle, *Staphylinus vulpinus* Nordm. Sex of fly, female. Southbridge, Mass., August 12, 1915 (S. W. B.). The rove beetle, *Staphylinus maculosus* Grav. Sex of fly, female. Ramsey, N. J., August 4, 1917. (Collected by Dr. F. E. Lutz; on exhibit in American Museum of Natural History in lot of insects collected by Dr. Lutz in his back yard.) An Oedomerid beetle, further unidentified. Sex of fly, male. Burlington, Mass., June 26, 1923 (G. W. Barber). The Cerambycid beetle, *Judolia cordifera* Oliv. Sex of fly, male, Concord, Mass., July 27, 1924 (G. W. Barber). The Scaraboeid beetle, *Serica trocifformis* Burm. Sex of fly, male. Chicopee, Mass. (collected by F. Knab, in collection of Massachusetts State College). The Rose chafer, *Macrodactylus subspinosus* Fabr. Sex of fly, male (J. Bequaert). The clover-leaf weevil, *Hypera punctata* Fabr. District of Columbia. (Recorded by McAtee and Banks: Proceedings of the Entomological Society

of Washington, Feb. 1920, vol. 22. No. 2, p. 25.) The flower beetle, *Trichius* sp. Poundridge, N. Y., July 20, 1935. Sex of fly, male (S. W. B.). The flower beetle, *Trichius* sp., Poundridge, N. Y., July 27, 1935. Sex of fly, female (S. W. B.). The Carrion beetle, *Silpha americana* L. Sex of fly, male. Poundridge, N. Y., July 27, 1935 (S. W. B.). The Carrion beetle, *Silpha americana* L. Sex of fly, female. Poundridge, N. Y., July 25, 1936 (S. W. B.).

HYMENOPTERA: The honey-bee worker, *Apis mellifica* L. Woburn, Mass., August 14, 1922. Sex of fly, female (G. W. Barber). The worker bumble-bee, *Bombus vagans* Smith. Woodstock, Conn., August 15, 1918. Sex of fly, male (S. W. B.). Bumble-bee worker, Inglenook, Pa., July, 1927 (A. B. Champlain). The bumble-bees, *Bombus fervidus* and *B. perplexus*. Boston, Mass., July 23, 1924, and August 3, 1927. Sex of flies, both female. (Recorded by O. E. Plath.)

LEPIDOPTERA: In "The Gypsy Moth" by Forbush and Fernald, 1896, p. 392, it was recorded that "Of the predaceous Diptera, the following species have been taken feeding upon the imagoes of the gypsy moth: *Dasyllis sacrator* Walk., attacking the females while laying;" What was evidently one of the specimens on which this observation was based is in the collection of the Massachusetts State College, bearing Williston's erroneous identification as *Dasyllis sacrator* Walker and the label, evidently Mosher's, "feeding on female moth," Woburn, Mass., July 7, 1895.

HEMIPTERA: The Cicada, *Tibicen sayii* S. & G., recorded by Champlain and Knull, Entomological News, 34, July 1923, p. 212.

It seems quite evident from this compilation that beetles are the preferred prey of *Bombomima grossa*. Interestingly enough, there appear the following insects of economic importance among the prey in addition to the Japanese beetle, the clover-leaf weevil, the rose chafer, and the gypsy moth.

Noteworthy in this connection appears to be the increase of this fly in Southwestern Connecticut with the rise of the Japanese beetle population. I had always considered this *Bombomima* a rarity, having seen only one specimen in Stamford during the three years 1929, 1930 and 1931. By 1940, four years after the Japanese beetle reached the laboratory grounds, it was not unusual to see as many as 4 or 5 of these big flies in the space of a few minutes' time near the various woodpiles along the margin of the woods or in the orchard and gardens, from late June through August, and to observe their aggressive actions against the Japanese beetle.

I have records of other large robber flies feeding on the Japanese beetle in other localities, but the only Asilid I have seen capturing *Popillia* in Stamford is *B. grossa*. On July 26, 1931, I took *Proctacanthus nigriventris* Macquart, which occurs only in the white sand country along the coast from Alabama and Florida north to Long Island, with a Japanese beetle as prey in the blueberry barrens of Bullock, New Jersey. On August 14, 1943, I took *Proctacanthus philadelphicus* Macquart, an erstwhile denizen of dry fields and pastures from New York and New England south in the mountains to Georgia, feeding on a Japanese beetle at Salem, New York.

P. philadelphicus formerly occurred on the grassy areas of the higher portions of our laboratory grounds, but strangely enough it began to disappear about the time that the Japanese beetle grub population became abundant. I have no explanation for this phenomenon, but the figures on the numbers of these flies noted at North Stamford over a period of successive years speak for themselves.

1935, 45 *P. phil.* noted: 1936, 36: 1937, 29: 1938, 27: 1939, 4: 1940, 2: 1941, 0: 1942, 11: 1943, 0: 1944, 0.

Ataenius darlingtoni Hinton a Synonym of *A. saluator* Fall.—Specimens of an *Ataenius* compared with the type of *Ataenius saluator* Fall (Journal of New York Ent. Soc., 1930, pp. 99, Vol. XXXVIII) and with a paratype of *Ataenius darlingtoni* Hinton (Annals and Magazine of Natural History, 1937, p. 179, Vol. XX) are identical with both. *A. darlingtoni* was described from Porto Rico, Santa Domingo and Jamaica. Dr. Chapin (Proc. U. S. N. M., 1940, p. 30) records other West Indian specimens from Hispaniola, Cuba, St. Croix, Antigua, Guadeloupe, and Grenada. *A. saluator* was described from Pensacola, Florida. I have examined specimens from Alexandria, La.; Biloxi, McComb, Jackson, Ocean Springs, and Lucedale, Miss.; Mobile and Auburn, Ala.; Columbus, Ga.; Pritchardville, Yemassee, and Blackville, South Carolina. *A. saluator* Fall may be separated from other U. S. *Ataenius* by a combination of three characters: crenate fimbriate lateral thoracic margin, finely densely punctate ninth elytral interval, and the posterior tibial fringe invariably of a group of four fimbriae.—O. L. CARTWRIGHT, South Carolina Exp. Sta., Clemson, S. C.